

METHOD FOR VISUAL TRACKING USING SWITCHING LINEAR  
DYNAMIC SYSTEM MODELS

ABSTRACT OF THE DISCLOSURE

5           A target in a sequence of measurements is tracked by modeling the target  
with a switching linear dynamic system (SLDS) having a plurality of dynamic  
models. Each dynamic model is associated with a switching state such that a model  
is selected when its associated switching state is true. A set of continuous state  
estimates is determined for a given measurement, and for each possible switching  
10   state. A state transition record is then determined by determining and recording, for  
a given measurement and for each possible switching state, an optimal previous  
switching state, based on the measurement sequence, where the optimal previous  
switching state optimizes a transition probability based on the set of continuous state  
estimates. A measurement model of the target is fitted to the measurement  
15   sequence. The measurement model is the description of the influence of the state on  
the measurement. It couples what is observed to the estimated target. Finally, a  
trajectory of the target is estimated from the measurement model fitting, the state  
transition record and parameters of the SLDS, where the estimated trajectory is a  
sequence of continuous state estimates of the target which correspond to the  
20   measurement sequence. The set of continuous state estimates is preferably obtained  
through Viterbi prediction. The optimal previous switching state can be an optimal  
prior switching state, or can be an optimal posterior switching state.